



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/576,731	05/23/2000	William Dean Bauman	DP-300043	4741

7590

05/28/2004

Delphi Technologies Inc.
Legal Staff
P O Box 5052
Mail Code 480 414 420
Troy, MI 48007-5052

EXAMINER

COMPTON, ERIC B

ART UNIT

PAPER NUMBER

3726

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/576,731

Applicant(s)

BAUMAN ET AL. *on*

Examiner

Eric B. Compton

Art Unit

3726

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-14 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1 and 3-14 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 7, 2004, has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, and 3-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' Admitted Prior Art (AAPA) in view of U.S. Patent 5,878,496 to Liu et al.

AAPA, as found on pages 1-6 of the specification, discloses a prior art process for forming a metal roller bearing comprising forming a steel blank by either warm forging, hot forging, cold forging, and machining. As shown in Figure 1, various grinding processes form the specific bearing surfaces of the blank. AAPA also discloses that it is known to form a bearing having a crown surface. See page 5, lines 15-16.

However, AAPA does not disclose hard turning to form the inner and outer bearing surfaces.

Liu et al disclose forming a metal cylindrical bearing roller, consisting of the steps of:

obtaining a hardened metal cylindrical blank having end face surface, a lateral surface defining an outer diameter, and a centered circular bore, said bore having an inner surface defining an inner diameter (see Figure 3, Claim 7).

hard turning the surface of the blank to a specified outer diameter (Col. 8, lines 10-14). Liu et al teach turning the inner surface of the bore rather than grinding, but discuss other processes that may be utilized "such as facing, milling, boring, broaching, drilling, and other related techniques for material removal." Col. 9, lines 39-41. Grinding and honing are disclosed as material removal process known to the inventors and thus are at least contemplated by the invention. Col. 1, line 45.

Liu et al is directed towards selectively machining a pre-hardened component by "identifying those in-service stresses that limit the service life of the component and then inducing an appropriate level of residual stress within the component in order to offset the in-service stresses and thereby substantially optimize the component's service life." Col. 2, lines 23-27. Figure 3 shows a bearing race (10). One having ordinary skill in the art at the time the invention was made would have realizes that in a bearing race, such as the one disclosed by Liu et al, that the stress levels are generally normal to the inner (or outer) bearing surface rather than the end faces. See U.S. Pat. 4,802,775 (showing stress distribution in a standard roller bearing is perpendicular to the inner (or outer)

bearing race surfaces only). Thus, for a roller bearing race, as shown in Figure 3, one having ordinary skill in the art at the time the invention was made would have machined only the inner and outer surfaces of the bearing race of Liu et al, since only these surfaces are actually subject to stress.

Applicant discloses on page 2, second paragraph, "Since, in the prior art the finished end face surfaces provide the reference for subsequent grinding steps to obtain the specified outside and inside diameters of the bearing, it is extremely important that the end faces be carefully ground perpendicular to the axis of the bearing and parallel to each other. Thus, because of the accuracy needed, it is necessary to inspect and reface the surfaces of the grinding disks frequently." Thus, the step in AAPA of grinding the end faces was a step required only to prepare the blank for subsequent grinding. Liu et al note "It is still another object of the invention such that a process enables conventional steps of a component's manufacturing sequence, such as rough machining, grinding and superfinishing, to be eliminated or replaced so as to reduce the setup time and processing time and costs for the component." Col. 2, lines 28-33. Therefore, since Liu et al eliminate the need for grinding, there is no need for the step of machining the end surface, either. See *Ex parte Wu*, 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989) (holding that it would have been obvious to omit an element of the primary reference where the function attributed to such an element is not desired or required).

Regarding claim 1, it would have been obvious to one of ordinary skill in the art, at the time of invention, to have formed the cylindrical (metal roller) bearing of AAPA by hard turning the inner and outer bearing surfaces without grinding, in light of the

Art Unit: 3726

teachings of Liu et al, in order to produce a bearing “eliminating rough machining, grinding and superfinishing [as] steps in the [conventional] production of the bearing race ...” Col. 9, lines 11-34). Note: this is precisely the motivation behind Applicant’s invention. See Specification, page 6, lines 17-20.

Regarding claim 3, AAPA discloses providing a steel blank formed by either forging or machining.

Regarding claim 4, AAPA notes that heat treating of the blank prior to finishing is known (see page 8, lines 11-15). Liu et al also note heat treatment of the workpiece.

Regarding claims 5-6, AAPA disclosed that it is known to forge the blank. Therefore, a flash piece is formed that must be subsequently removed. The prior art teaches grinding to finish the inner surface of the bore. This operation inherently will remove the flash. Liu et al teach turning the inner surface of the bore rather than grinding, but discuss other processes that may be utilized “such as facing, milling, boring, broaching, drilling, and other related techniques for material removal.” Col. 9, lines 39-41. Grinding and honing are disclosed as material removal process known to the inventors. Col. 1, line 45.

Regarding claim 7, Official Notice is taken that diamond-honing machinery is known in the art. See also Liu et al, Col. 5, lines 52+.

Regarding claim 8, AAPA notes that forming an incised cross-hatched pattern on the inner surface of the bore is known (see page 2, lines 18-20).

Regarding claim 9, Official Notice is taken that the use of computer numerically controlled (CNC) lathes is well known in the art of manufacturing.

Regarding claims 10-11, the specification notes that, "The steps of hard turning of the surface of the bore and the lateral surface of the blank can be carried out in either order ..." (page 9, line 15-16). Therefore, it would have been obvious to a skilled artisan to perform these steps in either order since it has no effect on the implementation of the invention.

Regarding claim 12, Official Notice is also taken that cubic boron nitride or ceramic cutting coated tools are well known in the machining arts to extend the life of the tool. See also Liu et al, Col. 5, lines 52+.

Regarding claim 13, Liu et al suggests that the hard turning of the surfaces can be carried out in a single operation. See Col. 8, lines 11-14 (disclosing "a turning operation") (emphasis added).

Regarding claim 14, it is inherent that the end face surfaces of the blank correspond to the end face surfaces of a cylindrical bearing roller.

Response to Arguments

4. Applicant's arguments filed April 7, 2004 ("Response"), have been considered but are not found persuasive.

Applicant argues that Liu et al do not disclose that the "end face surfaces are unmachined," as required by claim 1. Response, page 6. However, this argument is not found persuasive.

In Liu et al reference number (10) is directed to a bearing race, rather than a particular surface, e.g., end face, of the bearing. See Col. 4, lines 7-8. The reference

Art Unit: 3726

further discloses that "[t]he bearing *surfaces* of the races were machined ..." Col. 8, lines 10-11 (emphasis added), clearly suggestion that Liu et al did not intend for reference numeral (10) to be construed as Applicant suggests.

Liu et al is directed towards selectively machining a pre-hardened component by "identifying those in-service stresses that limit the service life of the component and then inducing an appropriate level of residual stress within the component in order to offset the in-service stresses and thereby substantially optimize the component's service life." Col. 2, lines 23-27. Figure 3 shows a bearing race (10). One having ordinary skill in the art at the time the invention was made would have realizes that in a bearing race, such as the one disclosed by Liu et al, that the stress levels are generally normal to the inner (or outer) bearing surface rather than the end faces. See U.S. Pat. 4,802,775 (showing stress distribution in a standard roller bearing is perpendicular to the inner (or outer) bearing race surfaces only). Thus, for a roller bearing race, as shown in Figure 3, one having ordinary skill in the art at the time the invention was made would have machined only the inner and outer surfaces of the bearing race of Liu et al, since only these surfaces are actually subject to stress.

Applicant notes on page 2, second paragraph, "Since, in the prior art the finished end face surfaces provide the reference for subsequent grinding steps to obtain the specified outside and inside diameters of the bearing, it is extremely important that the end faces be carefully ground perpendicular to the axis of the bearing and parallel to each other. Thus, because of the accuracy needed, it is necessary to inspect and reface the surfaces of the grinding disks frequently." Thus, the step in AAPA of grinding the

Art Unit: 3726

end faces was a step required only to prepare the blank for subsequent grinding. Liu et al note "It is still another object of the invention such that a process enables conventional steps of a component's manufacturing sequence, such as rough machining, grinding and superfinishing, to be eliminated or replaced so as to reduce the setup time and processing time and costs for the component." Col. 2, lines 28-33. Therefore, since Liu et al eliminate the need for grinding, there is no need for the step of machining the end surface, either. *See Ex parte Wu*, 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989) (holding that it would have been obvious to omit an element of the primary reference where the function attributed to such an element is not desired or required).

Applicant's additional arguments regarding the transitional phrase "consisting of" are not found persuasive either, since Liu et al do not in any way require the step of machining the end faces, as the prior art required, and clearly explain that by relying on their process that many of the steps of the conventional process can be eliminated.

Therefore, Examiner maintains the rejections of the claims based on the combined teachings of AAPA and Liu.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B. Compton whose telephone number is (703) 305-0240. The examiner can normally be reached on M-F, 9-5.

Art Unit: 3726

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter B. Vo can be reached on (703) 308-1789. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Eric Compton
Patent Examiner
A/U 3726